

CLAIMS

1. A light emitting element comprising a plurality of layers interposed between a pair of electrodes opposed to each other,

5 wherein at least one of the plurality of layers is formed of a layer containing a light emitting material, and

10 wherein the layer containing the light emitting material is interposed between a layer containing an oxide semiconductor or metal oxide and a material having a higher hole transporting property than an electron transporting property, and a layer containing an oxide semiconductor or metal oxide and a material having a higher electron transporting property than a hole transporting property.

2. A display device comprises the light emitting element according to claim 1 in a pixel portion.

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3. A light emitting element comprising a plurality of layers interposed between a pair of electrodes opposed to each other,

wherein at least one of the plurality of layers is formed of a layer containing a light emitting material, and

20 wherein the layer containing the light emitting material is interposed between a layer containing an oxide semiconductor or metal oxide and a material having a higher hole transporting property than an electron transporting property, and a layer containing an oxide semiconductor or metal oxide, a material having a higher electron transporting property than a hole transporting property and a material which can donate an electron 25 to the material having a higher electron transporting property than a hole transporting property.

4. A display device comprises the light emitting element according to claim 3 in a pixel portion.

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5. A light emitting element comprising:
a pair of electrodes; and
first to third layers sequentially laminated between the pair of electrodes,
wherein the first layer contains an oxide semiconductor or metal oxide and a
5 material having a higher hole transporting property than an electron transporting
property,
wherein the second layer contains a light emitting material, and
wherein the third layer contains an oxide semiconductor or metal oxide and a
material having a higher electron transporting property than a hole transporting
10 property.

6. A light emitting element according to claim 5, wherein the first layer
comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

15 7. A display device comprises the light emitting element according to claim 5
in a pixel portion.

8. A light emitting element comprising:
a pair of electrodes; and
20 first to third layers sequentially laminated between the pair of electrodes,
wherein the first layer contains an oxide semiconductor or metal oxide and a
material having a higher hole transporting property than an electron transporting
property,
wherein the second layer contains a light emitting material, and
25 wherein the third layer contains an oxide semiconductor or metal oxide, a
material having a higher electron transporting property than a hole transporting property,
and a material which can donate an electron to the material having a higher electron
transporting property than a hole transporting property.

30 9. A light emitting element according to claim 8, wherein the first layer

comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

10. A display device comprises the light emitting element according to claim 8 in a pixel portion.

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11. A light emitting element comprising:

a pair of electrodes; and

first to fourth layers sequentially laminated between the pair of electrodes,

wherein the first layer contains an oxide semiconductor or metal oxide and a 10 material having a higher hole transporting property than an electron transporting property,

wherein the second layer contains a light emitting material,

wherein the third layer contains an oxide semiconductor or metal oxide and a material having a higher electron transporting property than a hole transporting property,

15 and

wherein the fourth layer contains an oxide semiconductor or metal oxide, a material having a higher electron transporting property than a hole transporting property, and a material which can donate an electron to the material having a higher electron transporting property than a hole transporting property.

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12. A light emitting element according to claim 11, wherein the first layer comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

13. A display device comprises the light emitting element according to claim 11 25 in a pixel portion.

14. A light emitting element comprising:

a pair of electrodes; and

first to fourth layers sequentially laminated between the pair of electrodes,

30 wherein the first layer contains an oxide semiconductor or metal oxide and a

material having a higher hole transporting property than an electron transporting property,

wherein the second layer contains a light emitting material,

5 wherein the third layer contains an oxide semiconductor or metal oxide and a material having a higher electron transporting property than a hole transporting property, and

wherein the fourth layer contains a material having a higher electron transporting property than a hole transporting property and a material which can donate an electron to the material having a higher electron transporting property than a hole 10 transporting property.

15. A light emitting element according to claim 14, wherein the first layer comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

15 16. A display device comprises the light emitting element according to claim 14 in a pixel portion.

17. A light emitting element comprising:

a pair of electrodes; and

20 first to fourth layers sequentially laminated between the pair of electrodes, wherein the first layer contains an oxide semiconductor or metal oxide and a material having a higher hole transporting property than an electron transporting property,

wherein the second layer contains a light emitting material,

25 wherein the third layer contains an oxide semiconductor or metal oxide and a material having a higher electron transporting property than a hole transporting property, and

wherein the fourth layer contains an oxide semiconductor or metal oxide and a material having a higher hole transporting property than an electron transporting 30 property.

18. A light emitting element according to Claim 17, wherein the first layer and the fourth layer are formed using the same material.

5 19. A light emitting element according to claim 17, wherein the first layer comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

20. A display device comprises the light emitting element according to claim 17 in a pixel portion.

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21. A light emitting element comprising:

a pair of electrodes; and

first to fourth layers sequentially laminated between the pair of electrodes,

wherein the first layer contains an oxide semiconductor or metal oxide and a 15 material having a higher hole transporting property than an electron transporting property,

wherein the second layer contains a light emitting material,

wherein the third layer contains an oxide semiconductor or metal oxide, a material having a higher electron transporting property than a hole transporting property, 20 and a material which can donate an electron to the material having a higher electron transporting property than a hole transporting property, and

wherein the fourth layer contains an oxide semiconductor or metal oxide, a material having a higher electron transporting property than a hole transporting property.

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22. A light emitting element according to Claim 21, wherein the first layer and the fourth layer are formed using the same material.

23. A light emitting element according to claim 21, wherein the first layer 30 comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

24. A display device comprises the light emitting element according to claim 21 in a pixel portion.

5 25. A light emitting element comprising:
 a pair of electrodes; and
 first to fifth layers sequentially laminated between the pair of electrodes,
 wherein the first layer contains an oxide semiconductor or metal oxide and a
 material having a higher hole transporting property than an electron transporting
10 property,
 wherein the second layer contains a light emitting material,
 wherein the third layer contains an oxide semiconductor or metal oxide and a
 material having a higher electron transporting property than a hole transporting
 property,
15 wherein the fourth layer contains an oxide semiconductor or metal oxide, a
 material having a higher electron transporting property than a hole transporting property,
 and a material which can donate an electron to the material having a higher electron
 transporting property than a hole transporting property, and
 wherein the fifth layer contains an oxide semiconductor or metal oxide and a
20 material having a higher hole transporting property than an electron transporting
 property.

26. A light emitting element according to Claim 25, wherein the first layer and
the fifth layer are formed using the same material.

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27. A light emitting element according to claim 25, wherein the first layer
comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

28. A display device comprises the light emitting element according to claim 25
30 in a pixel portion.

29. A light emitting element comprising:
a pair of electrodes; and
first to fifth layers sequentially laminated between the pair of electrodes,
5 wherein the first layer contains an oxide semiconductor or metal oxide and a material having a higher hole transporting property than an electron transporting property,
wherein the second layer contains a light emitting material,
wherein the third layer contains an oxide semiconductor or metal oxide and a
10 material having a higher electron transporting property than a hole transporting property,
wherein the fourth layer contains a material having a higher electron transporting property than a hole transporting property and a material which can donate an electron to the material having a higher electron transporting property than a hole
15 transporting property, and
wherein the fifth layer contains an oxide semiconductor or metal oxide and a material having a higher hole transporting property than an electron transporting property.

20 30. A light emitting element according to Claim 29, wherein the first layer and the fifth layer are formed using the same material.

31. A light emitting element according to claim 29, wherein the first layer comprises molybdenum oxide and 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl.

25 32. A display device comprises the light emitting element according to claim 29 in a pixel portion.